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PSYCHOLOGICAL FACTORS IN MAXIMIZING SELF-CONTROL
UNDER STRESS WITH SPECIAL REFERENCE TO HYPNOSIS AND
RELATED STATES

by

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INTRODUCTION

In this paper we shall attempt to discuss the potential use of hypnosis in order to maximize the individual's capacity to withstand stress. After discussing hypnosis in this context, we shall try to discuss other relevant psychological techniques which need to be considered in evaluating the utility that hypnosis may have in this context.

Unfortunately, no specific literature exists on the use of hypnosis in order to maximize resistance to stress. It will, therefore, be necessary to extrapolate from clinical and experimental evidence which was not intended for the most part to deal with this problem.

In view of the broad meaning of the concept of stress, it seems necessary to define the type of stress with which this paper will be principally concerned.

Stress is viewed to mean any physical or psychological environmental pressure which, if it were continued for a sufficient period at a sufficient intensity, would disrupt the functioning of the individual. In this context successful functioning means the continuation of activities in order to carry out the purposes and intentions of the individual as they existed prior to, and independent of, the

stress. It does not refer to the individual's maximizing his comfort or security if this interferes with the optimal behavior to actualize his purposes and intentions. Successful resistance to stress could, therefore, be the continuing of activity regardless of environmental pressures or alterations of activity designed to cope with the environment without however altering the purposes, aims, or ideals of the individual. Failure to resist stress would be a change of ultimate purposes and aims in response to environmental pressure; the result of such failure could be some form of breakdown.

Several aspects of hypnosis need to be considered in order to evaluate the potential utility of this technique in maximizing an individual's resistance to stress.

The specific aspects of hypnosis which might prove valuable as resources in resisting stress are 1) the ability of the hypnotized subject to tolerate intense pain without apparent discomfort, 2) an apparent increase in physical capacity, 3) the ability to develop a high degree of motivation which can be maintained over a long period, and 4) the ability to control selectively knowledge available to consciousness.

In evaluating the possible utility of hypnosis in situations of stress, it is necessary to consider the conditions most suitable for attaining this state and the probability that any given individual will be able to do so.

For the hypnotic phenomenon to be useful to the individual during the time of stress, it must be available to him at these

times. Two possibilities will be evaluated: 1) post-hypnotic suggestion and 2) training in self-hypnosis.

HYPNOTICALLY-INDUCED ANAESTHESIA AND ANALGESIA

It has long been recognized that the deeply hypnotized subject is able to undergo exceedingly painful procedures without reporting discomfort and with little external evidence of pain. Prior to the discovery of anaesthetic agents, much of the interest in hypnosis focused on anaesthesia. Esdaile (15)* conducted a large series of operations solely employing hypnosis as the anaesthetic agent. With the discovery of ether and chloroform, the interest in this aspect of hypnosis waned, to be revived within the last 15 years. There have been reports within recent years of major surgery including caesarian section, thyroidectomies, as well as a variety of other major procedures including even cardiac operations performed without any anaesthetic other than deep hypnosis. While the use of hypnosis in major surgery has been extremely limited, being primarily a demonstration of the possibility of so doing, there has been a very widespread use of hypnosis in order to control the pain of dental procedures as well as childbirth. From a clinical point of view there is no question that with suitable subjects hypnosis can induce a degree of anaesthesia which will completely block the subjective appreciation of pain. According to many clinical reports [e.g., Moss (24); Shaw (46); Winkelstein (58)] this procedure reduces the morbidity which normally accompanies the operation. However, no controlled data are available to substantiate these reports.

* Numbers in parentheses refer to the item in the bibliography.

Recently there has been considerable interest in the use of hypnotic techniques to suppress intractable pain such as severe burns, shingles, tri-geminal neuralgia and, in particular, incurable malignancies. Striking success in providing comfort to patients with severe pain has been reported (5, 6, 7, 14). This application suggests that hypnotic techniques may be effective not only to suppress acute pain during the actual sessions itself (such as is the case with the use of hypnosis for operative procedures) but also to suppress chronic pain in order to give relief over long periods of time. It should be noted, however, that in these instances the relief of pain is primarily affected with fairly continuous painful events of a similar nature rather than with unpredictable new painful sensations. Thus, morphine, for example, is extremely effective in relieving an existing pain, but while it raises the pain threshold, it will not prevent the appreciation of a new pain. Whether hypnotic procedures are effective much in the way morphine would be, or whether they can act to confer a relative immunity from new and different painful stimuli occurring suddenly, remains to be established.

The experimental work dealing with hypnotically-induced anaesthesia has been less convincing. Sears (45), West, Neill & Hardy (55) and others (3, 9, 10, 22) have tried to show that autonomic responses to painful stimuli are diminished in the individual who is hypnotically anaesthetized. Recently in an exhaustive review of the literature, Shor (47, 48) has reanalyzed previous data and has come to the conclusion that no evidence exists which would support this assertion. It appears then, that in a laboratory situation at

least, the autonomic correlates of pain are not significantly reduced by hypnosis; however, the subjective appreciation of pain can readily be affected and apparently eliminated by hypnotic techniques.

In a recent empirical study Shor (49) addressed himself to the reinvestigation of the effect of a highly painful electric shock on the subject's autonomic responsivity in hypnosis versus the waking state. In his design Shor purposively minimized the subject's anxiety during the experiment in order to investigate the response to the painful stimulus rather than to a complex anxiety-evoking situation. Under these circumstances he found a remarkably low level of autonomic responsivity both in hypnosis and in the waking state. While finding no significant differences in the subjects' autonomic responses to electric shock in hypnosis and in the waking state, there was uniform agreement among the subjects that they did not experience discomfort in hypnosis but did experience considerable pain in the waking state. Shor suggests that hypnosis probably affects the anxiety component of pain as well as the subjective appreciation of the sensation. Thus, one might well find marked differences in some clinical situations or in a laboratory situation designed to maximize rather than minimize the anxiety component. Unfortunately no experimental test of this hypothesis is available.

In summing up the experimental evidence, there is agreement among investigators that the subjective appreciation of pain can be reduced or eliminated by hypnosis. It is doubtful whether the autonomic response to the painful stimulus itself can be affected. It is highly probable, however, that the autonomic response to an anxiety-provoking situation could be reduced.

The clinical observation by dentists that highly anxious patients show the most dramatic relief from hypnotic analgesia would also suggest that hypnosis affects the anxiety component. Further, the observation that after several sessions many of these patients no longer require hypnosis in the dental situation, would fit with Shor's experimental evidence. In these instances the patients apparently cease to be anxious and are then able to tolerate the dental procedures with minimal discomfort.

While it remains to be established how hypnosis affects the appreciation of pain and reduces the anxiety accompanying painful situations, it has proved to be a useful technique in actual practice. It should be pointed out that it is considerably easier to reduce anxiety than to induce actual analgesia; again dentists report that some 90 percent of their patients benefit from hypnotic procedures while only some 25 percent are able to develop actual analgesia.

A considerable amount of research is needed to clarify these relationships. As we have already suggested, systematic studies with varying degrees of incidental anxiety are needed, since in the clinical context the fear of pain is probably more significant than the pain itself. Anaesthesiologists working with hypnosis and chemical agents have reported that even a minimal degree of hypnotic response by a patient markedly reduces the need for chemical anesthetic agents. This observation is by no means strange since it has long been recognized that an anxious patient requires far greater amounts of chemical anesthesia than one who is relaxed. Finally,

the mechanism of hypnotic analgesia itself is by no means clear. It is perhaps relevant that, at least in the lighter stages of barbituate anaesthesia, the patient's autonomic responses to pain remain preserved. Thus, it would seem most worthwhile to study the parallelisms between hypnotic analgesia and that induced by the barbituates.

PHYSICAL CAPACITY IN HYPNOSIS AND THE WAKING STATE

It is commonly believed that hypnotized individuals are capable of performing feats of strength and endurance beyond the capabilities of the normal waking individual. Two kinds of evidence have been used to support this assertion: 1) the apparently super-human feats of strength that individuals sometimes demonstrate during stage performances of hypnosis, such as supporting the weight of another person on their abdomen while they themselves are rigidly supported only by their head and their toes on two chairs which are as far apart as possible; and 2) the results of controlled laboratory studies.

Elsewhere the author (27) has discussed this aspect of hypnosis in more detail. It was found that all the apparently superhuman feats ascribed to hypnosis and demonstrated by stage performance are well within the capabilities of the normal waking individual.

In order to understand the laboratory studies it is necessary to consider their generic design. Thus, Nicholson (25),

Roush (39) and Williams (57) have demonstrated an increase in physical capacity due to hypnosis. In each of these studies subjects were asked to perform fatiguing tasks such as pulling an ergograph in the waking state and in hypnosis. Order effects were carefully controlled and insofar as possible instructions were the same in hypnosis as in the waking state. An increment of performance in the hypnotic state was used as evidence for increased capacity in hypnosis. As we have pointed out, this conclusion is not warranted because increased performance might well be a function of motivation rather than of actual capacity. If we assume that individuals in hypnosis are more highly motivated to conform with instructions than in the waking state--a view consistent with most theories of hypnosis--then we might well expect that the identical instructions would have a greater effect than when given in hypnosis without necessarily indicating an increase in physical capacity.

In order to test this interpretation of previous research, a study (27) compared the maximal hypnotic performance of individuals with the performance which the same individuals could manifest when highly motivated in the waking state. With the use of ego-involving motivation, it was demonstrated that all subjects were capable of exceeding their hypnotic performance in the waking state. It was concluded that there is no evidence which demonstrates that the subject has more physical capacity in hypnosis than in the waking state.

Thus, empirical findings would suggest that hypnosis is one of a number of motivational techniques which will induce an

individual to exert himself more than usual. However, when the results of hypnotic suggestion are compared with far simpler motivating procedures appealing to competition and the individual's view of himself as a man, it is less effective than these more conventional techniques.

THE EFFECT OF HYPNOSIS ON ATTITUDES AND MOTIVATION

In the preceding section we have interpreted the apparent increase in physical capacity on the basis of an increased motivation of the hypnotized individual to respond to the requests of the hypnotist. While there is a general consensus among workers in this area that such an increase in motivation exists, it is exceedingly difficult to demonstrate such an increase in studies that do not involve physical endurance or painful stimuli.

In brief, it would be necessary to demonstrate that the hypnotized subject is willing to carry out behavior that he would refuse to undertake in the waking state or that he will carry out behavior longer or better in response to hypnotic requests than in response to waking requests. While at first sight this operational formulation of a test of an increase in motivation in hypnosis would seem a simple task, we have thus far been unable to do so successfully. The principal problem encountered is the remarkable compliance of the unhypnotized individual in an experimental or quasi-experimental setting. To illustrate this point I often commence lectures on hypnosis to undergraduates as follows:

I will ask a student in the front row for his wallet, another for his watch, while still a third for his shoe. Two students elsewhere in the room may be asked to exchange ties while another is asked to change his seat. After all students have complied with these meaningless and somewhat embarrassing requests, I point out that if I had previously hypnotized them, everyone would have assumed that they were willing to carry out these embarrassing behaviors because they had been hypnotized. In point of fact the simple request to do so in this quasi-experimental context, emanating from an instructor, was quite sufficient to elicit the behavior.

Elsewhere the author (28) has discussed in detail the problems of empirically testing this proposition. In brief, waking experimental subjects are willing to carry out any task which an experimenter might conceivably request of them, thus making it impossible to show an increment in the range of behavior which will be carried out by hypnotized subjects.

The alternative procedure of testing the length of time during which an activity will be carried out in response to a request is also difficult. The problem here lies in selecting an appropriate control group. If an individual's performance is compared in hypnosis and in the waking state, it is common to find that the subject underachieves in the waking state in order to have the better relative performance in hypnosis. If the waking performance precedes the hypnotic performance without the subject being aware that he will subsequently be required to perform the task in hypnosis, this does not solve the problem. Practice effects cannot be controlled because the reverse order permits underachievement in the waking state (53, 54).

The impasse cannot readily be solved by comparing the performance of two different groups, one hypnotized and a control group awake. Under these circumstances it is possible to obtain data which would indicate that the hypnotic subject performs better, worse, or the same as the waking control group, largely depending upon how the waking control group is motivated.

The above discussion is intended merely to illustrate the problems in an experimental approach to an issue which at first sight would seem easily resolved. Ultimately, experimental work may be able to circumvent these problems; at this time, however, clinical evidence sheds more light than experimental findings on the issue.

In a clinical context situations are encountered which would indicate that in some instances at least, patients will carry out behaviors in response to hypnotic suggestion that they are unwilling or unable to undertake when simply requested to do so. All of the literature on symptom removal is relevant in this regard. For the purposes of our discussion here, the indications, counter-indications, and permanence of direct hypnotic symptom removal are not relevant. The significant observation is that patients show alterations of behavior in response to hypnotic suggestions, which could not be elicited by instructions given in the waking state.

Of equal and perhaps even greater relevance is the clinical observation that habit patterns can be materially affected by requests given in the hypnotic state. In particular, over-eating and smoking, both notoriously resistant to change in response to requests, have been radically affected by hypnotic suggestion. Thus,

the range of behavior that patients are willing to carry out as well as the motivation to comply with instructions appears more affected by requests in hypnosis than by the same requests without hypnosis.

In addition to the behavioral evidence cited above, many psychiatrists in utilizing hypnosis have observed a remarkable tendency of patients to develop intense and rapid transference feelings. Recently Gill and Brenman (18) have discussed the ways in which the transference observed during hypnosis differs from the transference seen in usual psychoanalytic treatment. In more general terms these observations would indicate that hypnosis leads to a more rapid development of motivation to follow the instructions of the hypnotist than would be encountered if this technique were not employed.

A related question is whether hypnosis can cause significant and enduring alterations in the basic attitudes of the individual. Early work with suggestive therapy soon focused around the use of hypnosis to affect attitudes underlying undesirable behavior patterns (2, 35, 50). According to these authors significant and enduring changes of attitudes could be effected by suggestive techniques. Fairly recently there has been a resurgent interest in this type of approach with favorable results reported (12, 19, 23, 36). Unfortunately, in a therapeutic situation a large number of variables are involved, and there is no way to be certain that the specific suggestions of changed attitudes were the only or even the principal factors which caused the patients to change their attitudes.

The only experimental studies with hypnotically-suggested attitude changes have been conducted by Rosenberg (37, 38). He presents evidence that attitudes can be significantly altered by direct suggestion and that the changes will persist at least for several weeks.

Neither experimental nor clinical data are available on the persistence of hypnotically-induced attitudes under situations of stress. In the absence of any empirical data there is no a priori reason to assume that hypnotically-induced attitudes are more resistant to modification by stress than attitudes acquired in a more conventional manner.

In summing up, it would seem that despite convincing experimental evidence, which is difficult to obtain largely because of the limitation of the experimental technique itself, there is reason to accept the hypothesis that hypnosis does increase an individual's motivation to carry out requests of the hypnotist. Particularly in a medical context, hypnosis appears to be an unusually powerful technique for inducing individuals to carry out requested behavior persistently. In other contexts it does not appear to be more effective than other techniques. It may be important that the hypnotic suggestions given in a medical context are to benefit the patient and are personally meaningful to him while in other contexts requests lack such personal relevance. Thus, it is not enough to ask whether hypnosis increases the probability of a request being carried out more than other motivational techniques; rather the question may be, how effective is hypnosis in eliciting certain specific categories of

behavior, i.e., behavior to benefit the individual which he might be disinclined to carry out versus behavior of no personal relevance.

SELECTIVELY-INDUCED AMNESIA AND HYPNOSIS

One of the more striking phenomena of hypnosis is the inability of the subject to recall information that he is instructed to forget. In suitable individuals it is possible to give a set of instructions which they are apparently totally unable to recall after having been instructed to forget them. It is equally possible to cause a subject to forget information normally available including thoroughly overlearned material, such as his name, a number, color, etc. Despite much urging, the subject will be unable to remember the material for which amnesia was induced. If, for example, the suggestion has been given that the number three will be forgotten, the subject typically will count, "One, two, four, five." He will continue to count, "Ten, eleven, twelve, fourteen, etc." Again the count will go, "Twenty-eight, twenty-nine, forty, etc." When the subject is asked to do simple arithmetic, such as subtracting seven from ten, he will tend to look confused and answer, "Two," or "Four." If his response is, let us say, "Two," he may then be asked, "What is eight from ten?" and he will again respond, "Two." By this time the subject usually shows considerable discomfort and confusion. It will be clear to him that something is the matter, but he will be unable to specify what and why.

It is easy to see how this phenomenon might appear useful in certain stressful situations, such as capture and interrogation, where an individual has information available to him which must be protected. The feasibility of this approach must be considered in terms of the technical problems involved. First and foremost, it is necessary to point out that at best 25 percent of the normal population would be able to obtain the depth of hypnosis necessary for this phenomenon. Probably, however, the percentage is closer to 15 percent. Further, this type of experimental demonstration, while dramatic, does not really approximate a stress situation in life. For example, we have found that when the hypnotist himself does the prodding, there is a far smaller tendency for the subject to report the material for which he is supposed to be amnesic than if another experimenter tries to elicit the material. There is an even higher probability that the subject will recall the material in a discussion with someone whom he does not view as related to the experiment at all. Because of the potential complications inherent in leaving the subject with a suggestion to forget, let us say, the number three, no data are available on the persistence of this type of suggestion. Carefully conducted research with proper safeguards for the subject will be required. At this point, however, it is our impression that in most instances the amnesia will rapidly disappear.

Some data are available on the persistence of amnesia over a period of a week. In the context of another study in our laboratory, it was necessary that subjects retain their amnesia for long periods. Thus, subjects who manifested complete amnesia for the hypnotic

session were asked to return one week later, and at that time the subjects were interviewed by another experimenter about their previous hypnotic experience. Over half of the subjects who initially reported complete amnesia had remembered considerable amounts of the material during the week's time.

It will be seen, therefore, that the widespread use of hypnotically-induced amnesia would not be feasible because of the difficulty of producing this phenomenon in a significant portion of the population. There would, however, be a small percentage of individuals capable of developing true amnesia for prolonged periods. Most subjects who maintain amnesia for one week will do so for longer periods as well. There is, however, in the total population only between five and ten percent of the people who develop this type of amnesia.

Within this small group of people capable of developing prolonged amnesia, it is still necessary to consider the nature of the amnesia involved. As Sutcliffe (53) has pointed out, the most striking characteristic of post-hypnotic amnesia is that the subject is unable to verbalize his knowledge directly. He is not aware that he knows the material which he has been told to forget. Thus, if amnesia for certain information has been induced and if the amnesic individual is then asked directly to recall the information in the waking state, he will be unable to do so. However, if the individual is asked to solve problems which for their solution require use of the information in question, he is able to solve the problems. Thus, if one asks for the material directly, the subject

is unable to verbalize it, but when the subject is asked subtly, the presence of the knowledge can be demonstrated (26).

Strickler (52) in studying the recall of nonsense syllables has shown that nonsense syllables learned under hypnosis for which the subject has amnesia are relearned considerably faster than other nonsense syllables which the subject had never learned at all. Orne and Fisher (32) have demonstrated that hypnotic amnesia does not prevent retroactive inhibition.

Summing up the evidence, it would seem that hypnotically-induced amnesia for critical information would not prove particularly useful to an individual under stress. Only a small number of individuals are capable of achieving this phenomenon and even in those individuals the material is far more readily available than is commonly recognized. There is reason to believe that it may be even more difficult for an individual to protect information which is not fully available to him in consciousness. Thus, he might well become aware of fragments which are critically important but where he cannot readily identify their significance. Some of the problems inherent in this approach have been discussed by the author elsewhere (29).

Despite our essentially negative evaluation of the utility of selective amnesia, it should be clear that many unresolved questions remain. Thus, the persistence of amnesia despite strong immediate rewards for recall over time has never been explored. Further, our assertions about the potential complications that such a procedure might entail for the subject are extrapolations from the available experimental and clinical evidence. Specific work directed

at the evaluation of the ability to withhold information consciously available versus information not available to consciousness would be highly desirable.

HYPNOTIZABILITY

It is generally recognized that individuals differ in the ease with which they are able to enter hypnosis. Individuals further differ in the extent to which they can experience the various hypnotic phenomena. Of a volunteer population of college age, less than ten percent fail to experience any hypnotic phenomena when they cooperate with the hypnotist. However, only 20 to 25 percent are able to enter fairly deep hypnosis and only a portion of these are the "really good" hypnotic subjects who may easily manifest all of the classic phenomena. The remaining 65 percent are able to manifest varying degrees of hypnotic phenomena. Practice will tend to increase the depth of hypnosis only to a moderate degree. While in exceptional instances dramatic increases in achieving hypnotic depth can take place, subjects as a rule reach a plateau of depth within two or three sessions. The major effect of practice is that it will enable the subject to reach his particular level of hypnosis more rapidly.

The above comments apply to volunteer subjects participating in hypnotic research, who are not being treated for psychological problems. In some clinical instances it is possible to demonstrate marked changes in hypnotizability, but these occur most commonly in individuals who fail to show any response at first.

Rarely have we found the depth (as indicated by the type and intensity of phenomena which can be experienced in response to appropriate suggestion) to vary after the first few sessions. Gill and Brenman (18) report similar findings in their clinical work.

Some authors, notably Erickson (11) in recent years, have insisted that all individuals can be deeply hypnotized. While Erickson has been able to demonstrate in isolated instances that deep hypnosis can be induced in apparently difficult subjects, systematic evidence is unavailable to substantiate his statement. Whenever systematic efforts have been made, the findings have been consistent with the view previously stated.

Certain evidence would suggest that under circumstances of high anxiety, hypnotizability may be augmented. Some dentists report remarkably high percentages of results; similarly, some obstetricians find that during labor hypnotizability is increased. Beecher's (1) findings on the effectiveness of the placebo in a battlefield situation versus that of a civilian hospital indicate that the placebo reaction is also augmented by high levels of anxiety. Unfortunately, no systematic investigation has been undertaken which would allow measurement of the increase in hypnotizability which occurs under high anxiety circumstances.

Considerable work is needed to determine whether hypnotizability could be increased by appropriate modifications of the situation. The use of long periods of time, high anxiety situations, mechanical aids, appropriate drugs, etc., have been suggested but have not been systematically studied. In the absence of further

progress, however, it is necessary to recognize the limitations presently inherent in any proposed use of hypnosis. The full effects could at best be expected in some 25 percent of the population, while varying degrees of help could be expected in another 65 percent; approximately 10 percent would not be expected to benefit at all.

THE PHENOMENON OF POST-HYPNOTIC SUGGESTION

In many ways the most intriguing aspect of hypnosis is that in appropriate subjects, a suggestion given during hypnosis will be carried out at a later date even in the absence of the hypnotist. It is possible to give a suggestion so as to elicit the specific behavior at some specified future time in response to a specified future event or in response to a specified future experience. The discussion below will deal with post-hypnotic behavior as it is observed in good hypnotic subjects. It should be clear that our discussion is of a phenomenon which can at present be elicited in less than 25 percent of the population. Nonetheless, as a paradigm for understanding how a significant interaction at one point in time may determine future experience and behavior, it is of extreme interest.

To describe a typical post-hypnotic response: I suggest to an excellent subject in deep hypnosis that when I remove my glasses he will remove his watch. On awakening the subject appears perfectly normal and has no recollection of his hypnotic experience. Some minutes later I remove my glasses and the subject continues to talk

with me, but can be seen shifting his watch from one hand to the other. When asked why he changed the position of his watch, he may report that the strap felt tight or perhaps that he experienced a mild discomfort (itching or the like) and wanted to gain relief from this sensation. When I inquire whether the watch is now comfortable, he will assure me that it is; however, when I again remove my glasses, the watch leaves the other wrist. I again query about the removal of the watch and am told that for some reason it again felt uncomfortable. I comment that this seems peculiar and suggest that the subject put on his watch and cease fidgeting. When he does so, I will be informed on inquiring that the watch now feels comfortable. However, on again removing my glasses, the subject will look up at me strangely and say with obvious discomfort, "I am sorry, but for some reason my watch feels uncomfortable again."

At this point particularly the intelligent subject will conclude that the peculiar feeling of his watch must somehow be related to a prior hypnotic suggestion. He may ask quite directly whether this is so. If I evade answering directly and rather ask the subject to figure it out, he will become quite discomforted and exhibit obvious conflict. Finally, he will remove his watch and conclude, "You must have given me a suggestion that I take off my watch." My response may now be that if this is the case he might like to try and keep his watch on, and he will readily agree; replacing it at this time on his wrist and reporting that it now feels comfortable. When in the course of further conversation, I again remove my glasses, the subject will smile and observe, "Ah,

that's it; I am supposed to remove my watch each time you remove your glasses. Well, I won't this time!" As we continue to talk, however, the subject's hand will be seen moving slowly toward his watch, but in the process of undoing the clasp, the subject may start, as if becoming aware of his behavior, and say firmly, "No, I won't." He will in a determined manner replace his left hand at his side and continue in conversation with a set expression. Within a minute or two, however, the hand will again approach the watch, and after one or more repetitions of this sequence, the subject finally may exclaim, "Ah, the hell with it!" and take off his watch.

In the above illustration of the typical post-hypnotic response of an excellent hypnotic subject, two conceptually distinct attributes of the phenomenon may be observed: 1) a lack of awareness of the source of motivation for an item of behavior, and 2) a compulsion to carry out an item of behavior. It should be noted that the lack of awareness is not a necessary and essential feature. It can be observed above that even after the subject had become aware that removing the watch was due to a post-hypnotic suggestion and even after he had decided at one level to "fight" the suggestion, he nonetheless found himself responding to it. Indeed it was only when the subject became aware that his removing the watch was a post-hypnotic suggestion that the compulsion aspect of the suggestion became apparent.

When the same post-hypnotic suggestion is given to different subjects, it is possible to observe widely dissimilar patterns of response. Some subjects will not rationalize their behavior; they

will merely remove the watch, and if asked why, they may reply that they felt an urge to do so. Other subjects will remove their watch without any apparent awareness of their behavior; they may actually seem surprised to find the watch in their hands. Still other subjects will show considerable conflict, apparently resisting an impulse; ultimately, they may or may not remove the watch.

Not all individuals who respond to post-hypnotic suggestion develop amnesia for the actual suggestion. It is oftentimes difficult to determine to what extent their responding to a suggestion is accompanied by a compulsion to do so. Thus, subjects may describe their experience in terms ranging from an irresistible impulse to carry out the suggested behavior to a rather bland statement, "I did what you told me to, because you asked me to do it." When it is made difficult for these subjects to carry out the suggestion, wide individual differences will be encountered in their attempts to carry out the post-hypnotic instructions.

While many aspects of post-hypnotic behavior cannot as yet be fully understood, it is necessary to keep in mind that the behavior which is usually observed could just as readily be elicited by means other than hypnosis.

It is not the range of behavior that individuals will carry out post-hypnotically but rather the subjective experience that the individual encounters while carrying out the behavior that characterizes post-hypnotic suggestion.

One other aspect of post-hypnotic behavior is relevant in this discussion. While demonstrations usually deal with simple

behavioral items, it should be noted that any and all phenomena which can be elicited in deep hypnosis can also be elicited post-hypnotically in suitable subjects. Here again the striking quality is not so much the actual behavior as the alterations in subjective experience and motivation.

It is beyond the scope of this paper to evaluate the various formulations which have been put forth to explain the post-hypnotic phenomenon or hypnosis in general. Rather the discussion here will be confined to relevant clinical and experimental observations in order to pinpoint problem areas where further work is essential for an adequate understanding of the phenomenon as it bears on the central theme of this meeting.

Persistence of Post-Hypnotic Behavior

Two experimental studies have concerned themselves specifically with studying the persistence of post-hypnotic behavior. In both instances the authors compared persistence of behavior in response to post-hypnotic suggestion with the persistence of the same behavior when waking control subjects are asked to carry out the behavior as part of their experimental instructions.

Kellogg (20) instructed subjects while hypnotized to read certain sonnets and that as they were reading, they would breathe twice as fast on even numbered pages. The same instruction was given to waking control subjects. All subjects were tested immediately after receiving instructions, the following day and then at one or two week intervals up to 90 days.

Kellogg reports that the post-hypnotic response declined during the first three weeks and then leveled off and continued without further decrement. The waking control subjects in contrast showed an initial rise in their response and then maintained a consistent high level of response throughout the duration of the experiment.

Kellogg's experimental design necessitated the repetitive testing of each subject; no conclusions could be drawn about the persistence of post-hypnotic behavior without practice of the response. Patten (34) addressed himself specifically to testing the persistence of post-hypnotic behavior without the confounding effect of practice.

Experimental and control subjects (in hypnosis and the waking state respectively) were instructed that at some later time they would be given a test where a series of words would be read to them. They were further instructed to press their right forefinger whenever the name of an animal was read. A sufficient number of subjects were run so that each subject was tested only once. Time intervals ranging from zero to thirty-three days after the initial instructions were used. At the time of the test in order to distract the subjects from the initial instruction, all subjects were told to note whether any words were presented twice. Pressing of the right forefinger was recorded.

Patten found that there was some decline in response to the post-hypnotic suggestion; however, it endured for the duration of the study. The waking control group showed less diminution in the strength of the response than the experimental group.

Both Patten's and Kellogg's studies conclude that post-hypnotic suggestion was less effective than simple instruction. These findings are clearly contrary to the popularly held view that post-hypnotic suggestion is a powerful technique for controlling behavior. They demonstrate that behavior can be affected for varying periods of time but that experimental instructions given to a cooperative subject are actually more effective. The interpretation of these results is difficult. It is probable that a different mechanism is responsible for the behavior of the experimental and control groups. The very fact that the hypnotic groups do significantly worse, in view of the consistent findings that the hypnotized subjects are highly motivated to comply with instructions, suggests this hypothesis.

Elsewhere the author (30) has discussed the very special form of social interaction which constitutes an experimental situation. As we have pointed out earlier, subjects will in this context undertake a remarkable range of activities and show a surprising degree of motivation in following them through. It would seem that the findings of Kellogg and Patten could be considered as much a study of the motivation of experimental subjects as an investigation of post-hypnotic behavior. Since the hypnotic subjects also are in an experiment, one might conclude that either hypnosis somehow interferes with the motivation or that it appeals to a different set of motives. Clarification of this issue would seem essential for an understanding both of hypnosis and the motivation of experimental subjects in general.

The clinical literature provides a marked contrast to the observations of Patten and Kellogg. We have already pointed to the results of post-hypnotic suggestion in weight reduction and habit suppression. It would seem that in these situations hypnotic suggestion is more effective than instructions given to the waking subject. Why is it that in a clinical situation where individuals are presumably highly motivated to comply with instructions, hypnosis may add to their motivation, while in an experimental context the opposite holds true. Perhaps hypnotic suggestion is particularly effective with the kinds of personally relevant behaviors involved in a clinical context. Unfortunately no empirical work has explored the differential effectiveness of hypnosis and instructions on different types of responses.

Erickson in a number of highly imaginative studies has investigated the nature of the post-hypnotic phenomenon. He reports persistence of post-hypnotic behavior of several years duration. Unfortunately, these clinical observations are not compared with the effect of simple instructions. Furthermore they were obtained by using subjects who were in a quasi-therapeutic relationship with the investigator.

One very recent report by Crasilneck and Hall (5) suggests that the mechanism of post-hypnotic suggestion may be different from that of waking requests. Working with terminal cancer patients in order to suppress intractable pain, Crasilneck and Hall suggested that in response to the hypnotist's voice the patient would move his forefinger. When these patients became moribund and ceased to

respond to any instructions from the medical or nursing personnel, they continued to raise their forefinger in response to suggestions from the hypnotist. What is most striking in this report is that the response of the forefinger was the only sign of life persisting in a number of moribund patients. Reality factors prevented the investigators from obtaining any control data; however, it would seem that in their study post-hypnotic suggestion was remarkably effective in eliciting behavior.

In both of the experimental studies and in the quasi-clinical reports on the persistence of post-hypnotic behavior the hypnotist personally tested for presence or absence of the post-hypnotic response. However, the situation about which we hope to draw inferences is one where the post-hypnotic response is performed without the direct observation of the hypnotist. Work currently being conducted in our laboratory addresses itself to this issue.¹

The behavioral item which was chosen is to instruct subjects to mail business reply cards daily for a period of 83 days; however, subjects are given 150 postcards and are not told the duration of the experiment. On the 70th day they receive a letter from the project director, who is not the hypnotist, telling them that the experiment is over. (This was intended to test the question whether hypnotized subjects would continue sending postcards as opposed to controls because the instructions to discontinue sending then did not stem from the hypnotist.) A number of other technical problems were controlled in this study such as the hypnotizability

¹Current research by E. Damaser.

of controls and depth of hypnosis. The study is as yet incomplete and a full discussion of its implications would take us beyond the scope of this paper. It is relevant because it is the first investigation studying the effect of suggestion, waking request and a combination of these two on a quantifiable response carried out in the absence of the hypnotist. The preliminary data clearly support the finding of Patten and Kellogg. Thus, the post-hypnotic suggestion group is significantly worse than an equally hypnotizable group following a waking request.

Thus far, experimental data all support the finding that in tasks which are not personally relevant post-hypnotic suggestion is effective in eliciting a response requested in hypnosis. With suitable subjects the individual is not aware of why he is carrying out the requested behavior; however, instruction in the waking state is more effective in eliciting a response than post-hypnotic suggestion. It is our clinical impression derived from both work with patients and interviews with experimental subjects that there are considerable differences in the subjective experience of the individual carrying a waking request versus a post-hypnotic suggestion and further that the motivational basis for the response may be different in these two types of situations. No systematic data are available to support this hypothesis. In accounting for the clinical evidence, however, we are compelled to assume that under certain circumstances, at least, post-hypnotic suggestion provides a different and more effective motivational basis than the waking request. Hopefully,

we shall be able eventually to specify the conditions under which this occurs.

The Effect of Changing Reality Conditions on the Performance of Post-Hypnotic Behavior

Erickson in some of his experimental and quasi-experimental work with post-hypnotic suggestion (13) makes the point that post-hypnotic behavior can best be viewed as a reinstatement of the original hypnotic state lasting only for the duration of the response. He further implies that the post-hypnotic suggestion, once given, acts as an unconscious motive largely independent of the reality situation except insofar as it provides the necessary cues for the execution of the post-hypnotic behavior. He observes that when a subject is given a post-hypnotic suggestion which cannot be carried out, i.e., told in hypnosis to place a certain pencil in his pocket which is removed before the subject is awakened, the individual lapses into deep hypnosis.

In this context we shall not try to examine the evidence for and against Erickson's formulation of the mechanism of post-hypnotic behavior. Indeed the clarification of the mechanism is a necessary research task; however, we are more concerned here with the autonomy of a post-hypnotic suggestion from significant alterations in the subject's environment. All of Erickson's research demonstrating the fixed nature of the post-hypnotic response involves observation by Erickson himself. Thus, it would be possible that Erickson communicated to the subject in the waking state the precise nature of the activity expected. A study by S. Fisher (16) strongly suggests this possibility.

Fisher gave a number of subjects the post-hypnotic suggestion that they would scratch their right ear each time that they heard the word "psychology." On awakening he tested for this response and found it present. At that point he was interrupted by one of his colleagues who dropped into his office for a visit. By his general behavior Fisher indicated that the experiment was terminated and the colleague, the subject and he engaged in casual conversation. In the course of this conversation the word "psychology" was brought up in context. The overwhelming majority of subjects no longer responded to the word by scratching their ear, despite the fact that the suggestion had not been removed. After a while the colleague excused himself and Fisher turned to the subject, became somewhat more formal and by his behavior indicated that the experiment was still in progress. In this situation when the word "psychology" was brought up, it again evoked the response of scratching the right ear.

Fisher concluded that the post-hypnotic suggestion does not lead to an automatic response; rather it is interpreted by the subject and he responds when it is appropriate. Thus, altering the context could, as it were, turn the response off and on.

Two aspects are particularly interesting in the Fisher experiment: 1) that a number of subjects insisted that they had carried out the suggested behavior throughout, while others gave very superficial rationalizations, suggesting that in retrospect subjects felt that they ought always to have responded to the word "psychology, 2) three subjects did always respond to the word "psychology" even during the casual conversation.

Fisher's study, though very suggestive, does not fully resolve the issue. Thus, it is possible that subjects perceived the post-hypnotic suggestion to mean that they will scratch their right ear when psychology is brought up during the experiment and assumed that the termination of the experiment implicitly meant that they ought no longer to respond. Further the fact that three subjects did respond consistently needs to be investigated. Thus, these three subjects might have caught on to the fact that they were supposed to respond even during casual conversation or there might have been a different process involved in their response than in that of the other subjects. This experiment ought to be repeated with explicit instructions to the subjects that for the next three days they would respond to the word "psychology."

From the point of view of using post-hypnotic suggestion as a technique to protect the individual against stress, a crucial issue on which no data are currently available is whether an individual will carry out suggested behavior when there is no way for the hypnotist to know whether this behavior is being carried out, when in fact the hypnotist apparently does not care whether the subject continues to respond to the suggestion.

The clinical situation does not offer us any data in regard to this question since therapists are always presumed to care whether their patients respond favorably. Further, the patient usually returns to tell the therapist the results of the suggestion. Again, no experimental evidence is available on this issue. This may not only be because the question has not been clearly formulated, but

also because of technical difficulties in monitoring private behavior. Yet it would seem that here we might well observe a difference between requested behavior and post-hypnotic suggestion. It would seem likely that subjects would not carry out behavior which they believe cannot possibly be verified by the experimenter, while post-hypnotic suggestion might be effective even though the hypnotist has no apparent way of knowing whether the suggestion is followed.

A closely related problem of considerable practical and theoretical interest is the connection between a continuing positive relationship of subject to hypnotist and the continuing performance of post-hypnotic behavior. It is known that a subject who had previously entered hypnosis with a particular hypnotist may refuse to do so if problems arise in the relationship. However, we have no data on the effect of a deteriorating relationship with the hypnotist on a post-hypnotic suggestion given by the hypnotist. Broadly stated the issue is, to what extent does the post-hypnotic suggestion come to motivate the individual as a quasi-autonomous unconscious wish that has become a part of the individual, and to what extent does its effectiveness depend on a continuing positive relationship with the original hypnotist. An analogue to this question is the issue of how permanent changes achieved in psychotherapy become. In theory, at least, definitive psychotherapy yields results independent of the relationship between therapist and patient while transference cures depend upon a continuing positive relationship with the therapist. Lest, however, we infer from this formulation an answer to the question raised above, it should be pointed out that no empirical

test of the proposition regarding psychotherapy is available. The technical problems in conducting a rigorous test of this widely accepted proposition are such that it may never actually be carried out.

In summarizing our discussion of the post-hypnotic phenomenon it is our impression that it presents an extremely useful paradigm for studying the effect of a variety of motivating techniques on behavior. The widely held assumption that post-hypnotic suggestion is uniquely effective in eliciting compliance to simple requests is not justified by the experimental evidence. On the contrary, waking request is considerably more effective in causing experimental subjects to perform simple tasks longer and more consistently than post-hypnotic suggestion. On the other hand, in certain clinical situations it would appear that post-hypnotic suggestion is remarkably effective. The paradox between clinical and experimental data requires explanation.

The mechanism of post-hypnotic behavior is not fully understood and elucidation is required. In particular, we have formulated two questions which appear central and where data are totally lacking: 1) Is it necessary for the subject to believe that the hypnotist will know or care whether a post-hypnotic suggestion is carried out for him to do so, and 2) Is a continuing positive relationship with the hypnotist necessary for the subject to continue to carry out post-hypnotic behavior. Empirical research to answer both of these questions will be technically difficult but necessary to evaluate the possible utility of hypnotic suggestion in situations of stress.

SELF-HYPNOSIS

An alternative to the use of post-hypnotic suggestion in making certain useful hypnotic phenomena available to the individual when needed is training in self-hypnosis. Despite widespread interest in this phenomenon there has been little systematic well-controlled research. Further, the differences between self-hypnosis and post-hypnotic phenomena may not be as great as is commonly believed.

The very term self-hypnosis implies that an individual enters hypnosis without a hypnotist. A number of ways have been developed to enable individuals to accomplish this goal and depending upon the purpose of the procedure, different aspects of hypnosis have been emphasized. Thus, religious and mystical as well as therapeutic aims have prompted individuals to explore procedures of self-hypnosis.

The most common medical way in which this technique is currently used in the United States is exemplified in the work of Erickson (12) who induces hypnosis in a patient and then suggests that the patient will be able to bring about the same experience in his absence by thinking about it. For example, in cases of terminal cancer, anesthesia may be suggested and once the patient has been able to respond to this suggestion, he will be "taught" to think about the idea of feeling no pain, thus inducing anesthesia in himself subsequently. The teaching takes place in hypnosis and the ideas are presented to the patient as post-hypnotic suggestions. It will be clear that in this instance it is difficult to differentiate whether the mechanism involved is a peculiar form of

post-hypnotic suggestion or whether it is more properly a self-induced hypnotic state. At the very least, it must be recognized that the self-induced hypnotic experience has very direct roots in the original hypnotic session. One of the interesting aspects of this technique is that it can be "taught" to a suitable subject very rapidly and that the skill can persist for a long period of time. From a clinical point of view, it is irrelevant whether this is post-hypnotic behavior or truly self-induced hypnosis. It would seem to have some of the properties of both. Until more is known empirically about the characteristics of post-hypnotic behavior, it will be difficult to evaluate what kind of an effect is involved.

The best known Western advocate of self-hypnosis or auto-suggestion was Coué (4). However, despite his famous edict that all suggestion is auto-suggestion and all hypnosis is self-hypnosis, his actual procedure differed but little from individuals of different persuasions. Thus, when doing a classic postural sway test, instead of saying to the subject, "Imagine yourself falling backwards; you are falling backwards," he would say "Say to yourself, 'I am falling backwards; I am falling further and further backwards.'" Despite the variation introduced in the more classical hypnotic procedure, the net result was the same and in his own practice and that of his advocates the subject was taught "self-hypnosis" by the hypnotist. Again there is difficulty in discriminating the extent to which we are dealing with a more classic post-hypnotic phenomenon.

The relationship between hypnosis and the various yoga systems has been subject to considerable commentary. All of the classical hypnotic phenomena have in one way or another been described in the context of yoga. It is outside of the framework of this paper to discuss in detail the relationship between the two states. We wish only to comment that the avowed purpose of yoga is for the individual to become independent of his external world and his physical wants. For these reasons control of pain and pleasure are important in the attainment of the yogi's goals. The training of yoga emphasizes many aspects typical of the hypnotic experience, such as concentration on relatively limited stimuli, quasi-rituals, and the relationship to a teacher. It is relevant in this context to note that yoga training is almost always undertaken with a master. While yoga literature does not emphasize this aspect, practice does. Thus, many of the conditions of hypnosis are incorporated into the situation, for the development of yoga meditation (8).²

The most systematically-developed medical application of self-hypnosis has been the technique of autogenic training developed by Schultz (43). This approach is avowedly derived from yoga but then has been stripped of its mystical roots and adapted to treatment purposes. The term "autogenic training" emphasizes the training and learning aspects of this technique. In brief, Schultz begins by asking the patient to learn a basic exercise. The individual is

²The same considerations apply to other mystical philosophical systems, such as Zen Buddhism.

asked to be seated in a comfortable chair, focus his thoughts on his right hand, and say to himself, "My right hand and arm are growing heavy; my right arm is growing relaxed. My right hand is growing heavy." This exercise is first undertaken in the presence of the physician but subsequently practiced by the patient at home. One of the significant differences between this technique and the approach of Erickson described above is that the patient learns during his practice sessions at home to achieve more effect in the absence of his doctor than in his presence.

Once the patient is able to induce the subjective experience of heaviness in the right arm, he proceeds to add another idea. He is taught to begin by making his arm heavy and then adding the idea of warmth. Thus he now concentrates, "My right arm is heavy; I am quiet and relaxed. My right arm is warm and comfortable." Once the patient has achieved the point where he is able to induce heaviness and warmth, he goes on to develop regular deep breathing and then subsequently may learn to induce total relaxation of his body, subjective experiences of calm, the experience of relaxing internal organs, etc. When desired, patients can be trained to slow their pulse, increase selectively circulation in various limbs, etc; they may further be instructed in the utilization of this technique in order to induce sleep, temporary analgesia, etc.

This technique has been widely used throughout central Europe and is currently considered one of the basic psychotherapeutic tools. It has been taught not merely in therapeutic settings but also as a prophylactic measure to large numbers of individuals.

As with many procedures of this kind a considerable body of very impressive clinical material is available. One of the most interesting examples of this kind is a case reported by Schultz (43) of an individual caught in an avalanche for hours while skiing. This individual who had been trained by him in the past was totally immobilized in the snow for several hours. However, during this time he selectively concentrated on each of his four limbs in rotation. On being rescued subsequently, this individual did not have any significant frostbite in contrast to the other members of the party. Further anecdotal evidence relevant to this discussion is presented by reports of patients who were inmates of concentration camps and who felt their training was a major factor in enabling them to withstand the physical and mental rigors of this situation.

It should be emphasized that despite the popularity of this technique in those parts of Europe under German influence,³ no rigorous experimental evaluation of these procedures has yet been undertaken. Thus, the tests which report changes of physiological function by trained individuals have not been compared with the capabilities of highly motivated untrained individuals. Anecdotal evidence, no matter how impressive, is at best suggestive. However, it would appear fruitful to examine rigorously the potential usefulness of autogenic training.

From a theoretical viewpoint there are several aspects of this technique which are particularly interesting. Thus, individuals

³Recently Luthe has translated Schultz's original work into English (Schultz & Luthe, 1959).

characteristically exceed their performance with the doctor on their subsequent practice. Further, many individuals who have considerable difficulties in entering hypnosis are able to develop considerable skill in autogenic training. Finally, it appears that these skills once thoroughly learned are available to the individual without further instruction. Regarding the training itself, it is relevant that this can be undertaken in a group situation with considerable ease.

Much information is needed in this regard. Little is known about the relative ease with which different types of individuals acquire the skill of autogenous training. Even less knowledge is available about the effectiveness of autogenous training in enabling individuals to resist stressful situations and the degree of physiological response that the individual can produce at will compared with their capabilities prior to training.

The relationship between hypnosis as we know it and the type of training proposed by Schultz is quite close. Thus, this technique has been designated by Kretchmer (21) in recent years one of its more ardent proponents, as "active hypnosis" in contradistinction to passive or classical hypnosis. Kretchmer has emphasized that individuals who have been trained in "active hypnosis" may easily enter classical hypnosis. Further, the classic phenomena of hypnosis may be induced during the "active hypnosis."

One of the interesting aspects of autogenous training is that individuals very rarely acquire considerable competence with this technique without active supervision by someone else. Thus,

despite the fact that much of the work of training is undertaken by the individuals in the absence of the hypnotist, a positive relationship with some professional individual appears to be a necessary aspect of the training. Probably the implied presence of this individual during private training sessions is necessary. Some of the same questions may be asked here as with the post-hypnotic phenomenon: to wit, is a continued positive relationship with one's teacher necessary in order to retain one's skills in autogenic training. If this were not the case for autogenous training, would it hold for self-hypnosis taught via post-hypnotic suggestion as discussed earlier.

In the absence of relevant experimental evidence we are forced to extrapolate from anecdotal material. Thus, in the writings of many mystics, it is reported that when they doubted either the Divinity itself or the interpretation of their teachers they found it impossible to attain experiences which they had been able to achieve in the past. To the extent that the mystical experience can be understood as a form of self-hypnosis, these anecdotal reports allow us to make the tenuous inference that a positive relationship with one's "teacher" in self-hypnosis may be of considerable importance. It is possible of course that this is important only in the early stages of acquiring these skills. If we were to extrapolate from the learning of other skills, such an assumption would seem justified. Future work will have to yield empirical answers to these questions.

In summarizing the work on auto-hypnosis in the context of this symposium it would seem that this method is preferable to

a simple post-hypnotic suggestion. A greater percentage of individuals can be taught auto-hypnosis than are able to benefit maximally by post-hypnotic suggestion. While post-hypnotic behavior appears to become less effective without periodic renewal of the suggestion, skills at self-hypnosis can be maintained and augmented by the individual himself. While post-hypnotic behavior may be experienced by the individual as somewhat alien and outside of his control, self-hypnosis can make available to the individual the same skills, but they are experienced as under his control.

On the other hand, it should be emphasized that almost no experimental evidence is available on self-hypnosis; the data available are all derived from a clinical or quasi-clinical context. It should be remembered that in these situations post-hypnotic suggestion has proved to be extremely effective. Thus, some of the apparent advantages of self-hypnosis may not be real insofar as they may just reflect a lack of evidence about self-hypnosis. The mechanism of action of self-hypnosis is totally unclear, and all of the issues raised in the previous section on post-hypnotic behavior need to be explored in relation to self-hypnosis. Finally, it is possible that the distinction between self-hypnosis and post-hypnotic behavior is artificial. A great many of the necessary and sufficient conditions are the same for both phenomena. Thus, hypnosis has been conceptualized as self-hypnosis and self-hypnosis may just as well be conceptualized as hypnosis. It remains to be established whether any essential differences exist between these two phenomena. It is clear, however, that a great many individuals find it more acceptable

to be trained in self-hypnosis than to "be hypnotized." If for no other reason this suggests that the potentiality of self-hypnosis as a useful technique ought to be explored.

GENERAL CONSIDERATIONS

Some of the major problems and unresolved issues in utilizing hypnosis to protect the individual from stress have been discussed; however, the use of a specialized technique such as hypnosis can be meaningfully considered only in the more general framework of psychological variables affecting an individual's tolerance to stress. While other papers will consider these problems in more detail it seems appropriate in the context of this discussion to sketch the general issues which need to be considered in any program of empirical research.

In the introduction we have tried to define stress as a stimulus which, if continued for a sufficient period at a sufficient intensity, will bring about breakdown of the individual. This defines a stimulus as a stress not by its objective qualities but rather by its effect on the individual. The reason this definition has been chosen is that it avoids the difficult, if not impossible, task of specifying in objective terms the stimulus properties of a stressor, the difficulty being that many stimuli may be stressors for some individuals but not for others. Except in the extreme ranges the past experience of the individual with the stimulus will determine the extent to which it is a stressor for the individual. This suggests

that one way of enabling an individual to become resistant to a stress is to enable him to have appropriate prior experience with the stimulus involved. The biological notion of immunization provides a model for this approach. If an individual is given the opportunity of dealing with a stimulus that is mildly stressful and he is able to do so successfully (mastering it in a psychological sense or again achieving homeostasis in a physical sense), he will tend to be able to tolerate a similar stimulus of somewhat greater intensity in the future. By exposure to stimuli of gradual increasing intensity the individual will eventually be able to tolerate stimuli which initially would have caused breakdown of functioning. Training is the behavioral corollary to the immunization model. Such a procedure alters the individual in a manner that a given stimulus ceases to be a stressor. Speaking strictly logically it does not enable an individual to tolerate a given stress better; rather it alters the range of stimuli which are stressors.

If we consider the question of what enables an individual to tolerate stimuli which are stressors for him, we encounter considerable individual differences. The notion of ego strength is the construct that is used to account for these differences clinically. While this term has wide clinical usage, there is no consensus either about what determines a given individual's ego strength or how it can be measured. It is generally agreed that early childhood experiences play a crucial role and that the availability of significant positive relationships during this time is essential. Further it is often conceived of as generalizing from many different types

of mastery experience and the relative absence of significant failures. Identification with positively cathected models is assumed to play a role. However, the relative weighting of these factors as well as the significance of later life experience and constitutional variables is the subject of much controversy. It is beyond the scope of this paper to delineate this concept. Rather it is intended to emphasize that wide individual differences exist in abilities to withstand stimuli that are stressors. Since the ego strength of an individual is, to a large part at least, a function of his early life experience and is augmented in adulthood only by significant emotional corrective experiences such as therapy, we can assume ego strength as a given for the purposes of this discussion.

Over and above the specific past experiences with certain classes of stimuli which tend to define stressors for the individual and the general ego strength at his disposal, there are a wide variety of situational factors which will determine his resistance to stress. These factors related to specific motivational variables are subject to environmental manipulations and tend to raise an individual's tolerance to stress generally. One might facetiously think of these as ego strength substitutes. A few of these variables are particularly relevant to this paper and are discussed below.

An example of a situational variable which affects an individual's tolerance for discomfort is his perception of normative behavior. Within a wide range individuals govern their willingness to work and also to endure discomfort, even pain, by what they

believe to be the behavior of individuals seen as their peers. Work norms are well known in industry; however, they also seem to apply in tests of human endurance such as athletics. The four-minute mile is a case in point. Until the four-minute mile was actually run it was assumed to exceed the capabilities of human endurance; however, once this record had been established a number of runners surpassed it within a remarkably short period. The same may be said for all record performances of athletic endurance. The average athlete in olympic competition far exceeds the performance of the outstanding athlete a generation ago. It seems unwarranted to assume that we are witnessing dramatic changes in human endurance; rather the goals of individuals in competition have changed as the norms of outstanding athletic performances have increased. One would wonder why no resourceful coach has hit upon the plan of informing athletes under his care of plausible but fictitious unofficial performances by their future opponents.

An illustration of this mechanism was encountered in a laboratory setting when we were attempting to devise a safe but highly noxious stimulus in the form of an electric shock to the hand. Equipment was built intended to deliver shock of an intensity well beyond that tolerable to anyone in the laboratory. However, experimental subjects soon demonstrated that the greatest possible intensity was still tolerable. Subsequent to this performance the members of the laboratory team found that indeed the shock level could be tolerated and the machine was modified to provide further intensity again well beyond what was viewed as tolerable by the members of the

laboratory. To our chagrin, it was necessary to modify the equipment yet a third time before it delivered shocks of sufficient intensity that no experimental subject wished to go to the very top of the scale. The subjective experience of the laboratory personnel is essentially similar to that of the athletes discussed previously. Once it was demonstrated by an experimental subject that the stimulus was tolerable, it did become so, at least for some members of the staff.

Another illustration of how effective norms might be in modifying the subjective experience of a situation as stressful is given in a recent experiment on "meaning deprivation" (33). It was felt that one of the major variables which affected subjects' behavior in sensory deprivation situations, were the accoutrements of the situation which defined the task as stressful and potentially dangerous. These include a physical examination and history, a subject release form which absolves the experimenter and institution of all responsibility of undue consequences, an aura of concern, continuous observation, and above all, the presence of an emergency "release" button. It was felt that these variables rather than sensory deprivation itself would account for many of the reported phenomena; accordingly ten subjects were treated in a manner identical to previous work in sensory deprivation but then placed in a well lighted experimental cubicle with food and water and an optional task. These subjects were not informed of the four-hour duration of the experiment.

The control group was treated the same way but were placed in the cubicle without previously signing a release form, a physical examination, nor was there a panic button present in the cubicle.

These subjects were told that they were control subjects for a sensory deprivation experiment.

The experimental subjects found the experiment quite unpleasant and reported a wide variety of subjective experience and discomfort not found in the control group as well as showing differences on "objective" pre- and post-experimental tests. It should be clear that the identical objective conditions resulted in very different experiences for the two groups of subjects depending upon the social definition of the situation. Were we to conduct this type of an experiment again, I suspect that we could keep the total procedure constant and yet achieve significant differences between a group which is told in advance that they are a control group from one where the subjects perceive themselves as experimental.

It would seem that one way in which we can markedly affect an individual's tolerance of stress is to manipulate his beliefs about his own performance in the situation. If he expects the situation to be stressful, it will tend to be so. If he feels that we expect him to be capable of mastering the stress, it will maximize the probability that he will do so.

Thus far, we have discussed stresses which can fairly readily be investigated in the laboratory. One kind of stress which plays a major role in life particularly during situations such as war, captivity, illness, etc., is extremely difficult to manipulate in experimental contexts. This is the absence of meaning as defined by the individual. We have tried to devise an experimental situation where individuals would discontinue following instructions because

they did not view their behavior as meaningful. For example, subjects would be placed in a small room and asked to do simple addition problems. Each sheet of paper would take about ten minutes to complete and they faced a stack of some 2000 sheets of paper. They were deprived of their watch and told to work, that the experimenter would eventually return. Under these circumstances subjects worked for many hours. Even when the task was not only to complete each page but upon completion of each page to tear it into many pieces and throw it away, subjects carried out their task faithfully. Despite the fact that they had to destroy their work they tended to work accurately. The experiment had been intended to be a psychologically-stressful situation insofar as it created a meaningless task for the subject. However, when the subjects were interviewed, it became clear that they had ascribed meaning to their experiences because they performed their task in the context of an experiment. Thus, some subjects (correctly) surmised that their performance was being monitored despite the apparent impossibility of so doing. Others felt that the experiment was designed to test their endurance, etc.⁴

Unfortunately, within the context of an experimental situation it is impossible--with the techniques presently available--to investigate the stress of futility and of being in a meaningless situation. Yet it is the feeling that one's performance is without meaning that can be extremely destructive in life situations. The

⁴These experimental studies were conducted by Mr. Thomas Menaker.

very fact that an experimental situation provides sufficient purpose for the experimental subject to undertake with relative comfort tasks which would otherwise be excessively boring and frustrating indicates that it is the mental set more than the objective properties of the task which define a situation as stressful for an individual. One might conceive of the experimental situation as providing a mental set which successfully protects the individual from this type of stress. It may be meaningful to view the experimental context as one of several powerful mental sets which will enable an individual successfully to perform tasks which would otherwise interfere with his functioning.

Closely related to the need for viewing one's behavior as purposive and meaningful is the individual's feeling that he can control his own behavior. For example, a recent review of the effects of sensory deprivation (51) discusses patients' reactions to confinement in an iron lung. The loss of control over one's motor functions is viewed as a significant stress. Schein (42) points to the significance of physical confinement in the "brainwashing" situation. In both of these reports it becomes clear that the individual feels powerless to control his behavior. However, in both instances some individuals are able to focus upon mental processes that remain under their control; these individuals are able to use whatever restricted range of behavior that remains available to them and maintain their ability to function. The attitudes and mental set of the individual may well determine to what extent he can find meaning in the situation and tolerate the loss of physical autonomy.

We should hypothesize that many individuals would be protected from the stress of these situations to a considerable degree if they perceived themselves as carrying out a purposive task. This hypothesis is supported by descriptions of concentration camp experiences (17). Appropriate instruction might well facilitate the individual's efforts to maintain autonomy.

In this connection one aspect of self-hypnosis is particularly relevant. The anecdote about the individual caught in an avalanche was discussed earlier. Schultz (43) ascribed the individual's successful resistance to frostbite to judicious control of his bloodflow to the extremities. An alternate hypothesis would be that the very activity of controlling the flow of blood allowed the individual to retain a measure of control over his autonomy. This prevented an anxiety reaction which would have decreased the bloodflow to the extremities. Perhaps the illusion of autonomy can effectively protect the individual from stress. This assumption is subject to empirical test. The hypothesis would be that individuals who had learned "autogeneous training" would better be able to resist a stress such as being in a tank-type respirator than individuals without such training.

A different psychological situation which can markedly affect an individual's ability to tolerate stress is illustrated in our laboratory research. Subjects are placed in a peculiar psychological situation in order to serve as controls for the performance of hypnotized individuals. The technical advantages and reasons for the use of this group have been described elsewhere (28). In

brief this is a group of subjects who are instructed to simulate hypnosis with the purpose of deceiving the experimenter. The subjects understand clearly that the experimenter does not know which subjects are simulating and will discontinue the experiment if he recognizes that they belong to this group. When we began to experiment with simulating subjects, we were surprised to find that, contrary to views reported in the literature, this group of subjects could not be distinguished from deeply hypnotized individuals by tasks involving painful stimulation. On the contrary, in an experiment by Shor (47) it was found that this group of subjects chose to tolerate a significantly higher level of painful stimulation than the hypnotized group. We have been unable thus far to find any behavior which this group would fail to undertake in a laboratory situation which would be carried out by hypnotized subjects. This includes a replication of the classic studies by Rowland (40) and Young (59) which purported to demonstrate that subjects in hypnosis would carry out self-destructive or anti-social behavior. In these experiments subjects were requested to handle a poisonous snake, remove a penny dissolving in fuming nitric acid with their bare fingers, and throw the acid at a laboratory assistant. In our replication five out of six deeply hypnotized subjects could be induced to carry out all of these behaviors, while six out of six simulating (waking) subjects did the same (31).

It appears to us that the situation where a subject is requested to simulate hypnotic behavior is in its own right one deserving of further investigation. Once the subject is committed to playing this role, it appears that he is willing to exert himself to the utmost, including the toleration of considerable anxiety and

actual pain, in order to continue with this task successfully. It would seem that the important variable is that the subject commit himself to the task of simulation. Once this commitment is made, it in itself becomes an extremely powerful motive to continue with the task no matter what the cost.

Unfortunately little systematic work has been done to our knowledge on the problem of commitment. In our situation the motivation for the initial commitment by the subject seems intuitively clear. The subject is given the opportunity of playing an important part in the experiment and at the same time of "Putting one over on the experimenter." To, as it were, legitimately make a fool of an authority figure is, to most college students, a very appealing task. It is interesting in this regard that the only difficulties that we have encountered in using this type of control group were when the experimenters were younger graduate students, particularly if they were female. Under these circumstances, some subjects experienced considerable guilt in deceiving the experimenter. The subjects' feelings in this regard were typically phrased as "I felt so badly about fooling that nice girl." Significantly though, subjects did not experience guilt in deceiving senior investigators.

The importance of an individual's commitment to a certain role in protecting him from stress has long been recognized intuitively and may form the basis for a wide variety of social institutions. For example, a military organization with a high esprit de corps tends to create a feeling among its members that they are committed to belonging to a special group of individuals. Because of their

membership in this group, they are expected to and indeed are able to tolerate stresses above the capabilities of the average individual. The training of the marine corps and the parachutists were particularly good examples in our own military.

The appeal to commitments and ideals as a way of effectively controlling behavior over long periods of time can be seen in the training of physicians as well as the ministry in our culture particularly clearly. In both instances individuals have to be trained to tolerate dealing with death in a manner that is supportive to the survivors. Both groups are exposed to fairly seriously stressful situations in the course of carrying out their daily professional work. Because these individuals are committed to legitimate roles it becomes considerably easier to tolerate these experiences. I can recall well during medical school being called upon to play the role of physician and how the role itself, once I was committed to it, acted as a major prop in performing tasks which might otherwise have caused me to become seriously troubled.

Thus far, we have used the term commitment rather loosely; however, it would seem necessary to be able to specify the antecedent conditions which would cause an individual to become committed to a role which then, in and of itself, becomes a useful prop against conditions of stress. It appears that at least three conceptually distinct factors may be isolated.

- 1) It is necessary that the individual find the role congenial, desirable, and appropriate to himself.
- 2) It is necessary that the role be legitimately ascribed to the individual by significant

figures whom he accepts as qualified to ascribe the role to him. Who the significant figures are varies with the role to be ascribed. Thus, peers might ascribe the role of leader while university authorities would ascribe the role of Ph. D. 3) It appears that commitment to a role is markedly enhanced by a legitimized, arduous, training period involving recognized rites de passage. It does not appear to us accidental that the roles which carry the greatest investment to the individual are those most difficult to obtain, and in the case of fraternities which wish to inspire considerable commitment in their members, difficult and elaborate initiation rites are practiced.

CONCLUDING REMARKS

Summarizing the general problem of psychological techniques to maximize the individual's resistance to stress, it would appear that over and above the individual's ego strength, his specific experience with stimuli closely related to the stressors is subject to systematic alteration, and further, that beliefs about the tolerance which his peers would have to the specific stress will affect the individual's own tolerance. We have pointed out that a frequently encountered stress in life is experiencing one's own behavior as meaningless, and that because of certain peculiarities within the structure of the experimental situation, it does not seem to be possible to investigate this stress within a laboratory context. Finally, we have suggested that certain roles, once they are assumed

by the individual, will be maintained at great cost and that in order to maintain them individuals appear willing to tolerate stress which they would otherwise avoid or perhaps be unable to tolerate.

Hypnosis as a specific technique to maximize an individual's tolerance to stress needs to be viewed in the light of these considerations. Certain hypnotic phenomena such as control over pain and the experience of fatigue may prove to be useful in this regard. However, it is useful to recognize that the total hypnotic situation embodies a number of the situational qualities discussed above. Thus, having learned to enter hypnosis and having successfully tolerated stimuli which would otherwise seem intolerable inevitably give the individual the experience of successful mastery of stimuli similar to those which will subsequently be stressors. Being a hypnotized subject itself involves assuming a role which the individual may be highly motivated to maintain. Beliefs shared by the hypnotist and subject about a hypnotized individual's tolerance of certain stresses redefine the norms by which the individual judges his own behavior. Finally, in a situation where an individual is robbed of his ability to control his environment or even his own body, hypnotic phenomena may provide a form of self-control of which the individual cannot be deprived.

A great number of unanswered questions prevent us from definitively evaluating the potential utility of hypnosis in order to increase the individual's self-control. The use of post-hypnotic suggestion or, perhaps even more effective, systematic training in self-hypnosis may provide a useful tool in enabling the individual

better to tolerate stress. A greater tolerance for stress could result in part from making available to the individual certain hypnotic phenomena. On the other hand, it could also be a function of a number of other independent psychological factors incidental to, but associated with, the hypnotic situation. The relative utility of of hypnotic phenomena (versus these incidentally-associated psychological factors) in enabling an individual to tolerate stress requires empirical clarification.

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